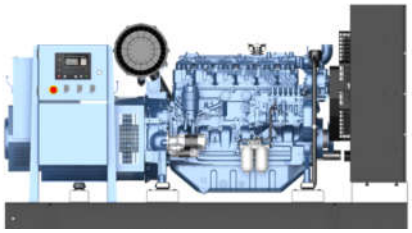
WPG220*8

DIESEL GENERATING SET

GENERATING SET RATINGS
3 Phase - 50Hz – 1500rpm @ 0.8pf.



Voltage	PRP		ESP	
V	**kVA**	kWe	**kVA**	kWe
415/240	**200**	160	**220**	176
400/230	**200**	160	**220**	176
380/220	**200**	160	**220**	176

PRODUCT FEATURES

Engine and block

•Cast iron gantry type structure block
•One-piece forged crankshaft
•Separate cast iron cylinder heads and wet liners
•Aluminum alloy pistons with oil cooling gallery

Cooling system

•Radiator and hoses supplied directly mounted on the engine
•Thermostatically-controlled system with belt driven coolant pump and pusher fan

Air intake and exhaust system

•Mid-position and below inlet turbocharger optimized for genset application
•Special rear-mounted air filter with restriction indicator
•Exhaust manifold shield for heat isolation
•Steel residential silencer -35db(A) attenuation.

Fuel system

•P-type fuel injection pump and injector for higher injection pressure
•Duplex fine filter for better efficiency

Electrical system

•12/ 24 Vdc electric starter motor and battery charging alternator
•12/ 24 Vdc maintenance free starter battery and Battery charger connecting cables.
•Low oil pressure & high water temperature sensors

Lubrication system

•Flat bottom large capacity oil pan
•Spin-on full-flow lube oil filter

Alternator

•Brushless, 4 Pole, IP23 drip-proof revolving field design
•Class H insulation and Class H temperature rise
•Low reactance with 2/3 pitch windings on the stator
•Direct-coupled by flexible disc
•Sustained overcurrent >300% in 10 sec
•Direct drive centrifugal blower fan cooling
•Main line 3P circuit breaker

Control module

•**WEICHAI** control module is ideal for a wide control range to manage, monitor, and diagnose quickly and easily.
•Display status message Provide protection Auto shutdown at fault detection

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GENERATING SET SPECIFICATIONS	
Brand	WEICHAI
Model	WPG220F8 (Open) / WPG220L8 (Enclosure)
Governor and regulation class	In accordance to ISO 8528-5 Class G2 performance, Compliance to 100% step load less than 10 sec
Phase number and connection	3 phase, 4 wires, Y-type
Cooling method	Closed looped water-cooled
Starting method	DC 12/ 24V Electric starter
Steady-state voltage deviation	≤±1%
Steady-state frequency band	≤±0.5%

ENGINE		
Brand		BAUDOUIN
Model		6M16G220/5
Gross Power	kWm	ESP - 200 / PRP - 182
Cylinder / Type / Aspiration		6 / In-line / Turbocharged and intercooled
Bore x Stroke	mm	126 x 130
Displacement	L	9.726
Compression ratio		17:1
Brake Mean Effective Pressure	kPa	ESP – 1645
Governor		Electronic

COOLING SYSTEM		
Type of Coolant		Liquid (water + 50% antifreeze) 35
Total Cooling System Capacity (with Radiator)	L	105
Max coolant temperature – shutdown Cooling	°C	415
Fan Airflow	m^3/min	

LUBRICATION SYSTEM		
Operating Temperature range before Engine	°C	78 -105
Oil fuel consumption ratio based on engine fuel consumption data	g/kW.hr	≤ 0.1%
Total system capacity (including filters)	L	30
Type of oil filter		Spin-on full flow filter

EXHAUST SYSTEM		
Exhaust Gas temperature after the turbocharger	°C	600
Exhaust Gas flow	m^3/min	ESP – 36.02 / PRP – 38.15
Max. Exhaust back pressure	mBar	60

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FUEL SYSTEM

Type of fuel filter		Spin-on fuel filter
Min. internal diameter of the supply pipe	mm	12
Min. internal diameter of the return pipe	mm	12
Max. fuel return restriction	Bar	0.5
Max. fuel inlet temperature	°C	50
Fuel supply flow	L/hr	169
Fuel Consumption (Tolerance +3%)		

Rating	gr/kWh	L/hr
100%ESP	193	46.9
100%PRP	193.8	43.1
75% PRP	193.9	32.4
50% PRP	201.6	22.4
25% PRP	226.1	12.6

ALTERNATOR

Brand	WEICHAI
Model	WHA-200-4/0.4
Rated Current	289A
Coupling / No. of Bearing	Direct / Single
Phase / Poles	3-Phase / 4-Pole
Type of Excitation	Self-excitation
Cooling type	Air
Voltage regulation method	AVR
Insurance	Class H
Temperature rise	Class H
Protection Grade	IP23
Efficiency at 0.8p.f.@100% load	93.3%

CONTROL MODULE

The **WEICHAI WHC6120NC** controller is an Auto Mains Failure Control Module, Emergency stop push button

Back-lit LCD display

3 Phase generator and 3 Phase Mains monitoring

Monitoring speed, frequency, voltage, current, oil pressure, coolant temperature and fuel level

Display warning, shutdown and engine status information

Hours counter provides accurate information for monitoring and maintenance.

Weichai Power Co., Ltd.

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Ratings definitions

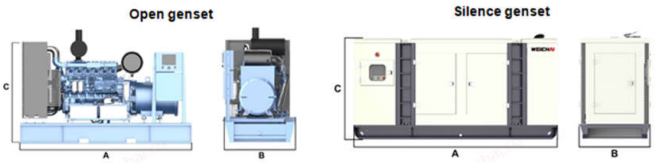
Emergency Standby Power (ESP):

According to ISO 8528-1:2018, Emergency Standby Power is the maximum power available for a varying load for the duration of a main power network failure. The average load factor over 24 hours of operation should not exceed 70% of the engine's ESP power rating.

Typical operational hours of the engine are 200 hours per year, with a maximum usage of 500 hours per year. This includes an annual maximum of 25 hours per year at the ESP power rating. No overload capability is allowed. The engine is not to be used for sustained utility paralleling applications.

Prime power (PRP):

According to ISO 8528-1:2018, Prime Power is the maximum power available for unlimited hours of usage in a variable load application. The average load factor should not exceed 70% of the engine's PRP power rating during any 24 hour period. An overload capability of 10% is available in accordance with ISO 3046; however, this is limited to 1 hour within every 12 hour period.



Standard version

· Antivibration shock absorber
· Chassis with integrated fuel tank
· Fuel level gauge
· Emergency stop push button is installed outside of the canopy
· Sound attenuated canopy made of high quality steel metal, Powder coating
· High mechanical strenght, Low noise level
· Easy acces for service mainteance
· Reinforced lifting eye to lift by crane
· Exhaust silencer is protected against environment influences
· IP23 canopies have been designed to prevent the ingress of water.

Environment Etc: Ambient conditions of reference according to ISO 8528-1:2018 normative: 1000 mbar, 25ºC, 30% relative humidity.

Dimension and Weight

Structure	Model	Dim "A" mm	Dim "B" mm	Dim "C" mm	Dry wt.* kg	Fuel tank L
Open	WPG220F8	2999	1170	1920	2300	420
Enclosure	WPG220L8	3900	1350	2050	3020	345

* Note: Weights represent a set with standard features. See outline drawings for weights of other configurations.

Codes and standards

ISO 9001	This generator set is designed and manufactured in facilities certified to ISO 9001.	ISO 8528	This generator set has been designed to comply with ISO 8528 regulation.
ISO14001	This generator set is designed and manufactured in facilities certified to environment management system ISO 14001.	CE	The CE marking is only valid when equipment is used in a fixed installation application. Material compliance declaration is available upon request.
ISO 45001	This generator set is designed and manufactured in facilities certified to OHSMS management system ISO 45001	TLC	This generator set has been certified according to YD/T502-2020 standard

Data and specifications are subject to change without notice.

For more information contact your local Weichai distributor or visit www.weichai.com

Contact information:

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Ratings

RPM	Gross Engine Output		
	COP kWm	PRP kWm	ESP kWm
1500	182	182	200

Basic data

Engine model 6M16G220/5
N° of Cylinders / Valves ..... 6 / 12
Cylinders arrangement ..... In line
Bore x Stroke (mm) ..... 126 x 130
Displacement (L) 9.726
Thermodynamic Cycle ..... Diesel 4 stroke
Cooling System ..... Liquid (water + 50% antifreeze)
Injection System ..... Direct
Fuel System ..... Mechanical Pump
Aspiration ..... Turbocharged and Aftercooled
Compression ratio ..... 17 : 1
Flywheel housing ..... SAE 1
Flywheel ..... 14"
N° of teeth on flywheel ring gear 136
Inertia of flywheel (kg/m²) 1.84
Inertia of crankshaft (kg/m²) 0.39
Emission standard ..... N/A
Overall Dimensions with radiator (Length x Width x Height) (mm) ..... 2075 x 1041 x 1259
Engine dry weight (kg) 1050
Engine wet weight (includes oil, coolant) (kg) 1123

Air intake system

Air intake temperature rise (°C) ..... ≤ 15
Air intake restriction clean filter (mBar) ..... ≤ 35
Air intake restriction dirty filter (mBar) ..... ≤ 70
Recommended air flow @ PRP (m³/min) 13.2
Recommended air flow @ ESP (m³/min) 14.2
Min. diameter of intake pipe (mm) 100

Intercooling system

Intercooler heat dissipating capacity @ PRP (kJ/s) 17.2
Intercooler heat dissipating capacity @ ESP (kJ/s) 20.9
Max. intake temperature @ 25°C ambient temperature (°C) 55
Max. difference between intake temperature and ambient temperature (°C) ..... ≤ 30
Max. intake pressure drop of intercooler (mBar) 120

Cooling system

System designed for ambient temperature up to (°C) 50
Min. inside diameter of coolant outlet pipe (mm) 45
Coolant capacity of radiator and pipes (L) 22
Coolant alarm (shutdown) temperature (°C) 105
Thermostat opening temperature / full open temperature (°C) ..... 71 / 82
Min. pressure in cooling system (Bar) 0.5
Coolant capacity of the engine (L) 22

Exhaust system

Max. exhaust back pressure (mBar) 60
Max. exhaust temperature before turbocharger (°C) ..... ≤ 700
Max. exhaust temperature after turbocharger (°C) ..... ≤ 600
Exhaust flow @ PRP (m³/min) 36.02
Exhaust flow @ ESP (m³/min) 38.15
Min. diameter of exhaust pipe (mm) 100
Max. bending moment of exhaust gas exit flange (Nm) 10

Lubrication system

Oil capacity Low / High (L) ..... 22 / 26
Oil pressure in normal condition idle speed (Bar) ..... 1.3 - 2.8
Oil pressure in normal condition at 1500 Rpm (Bar) ..... 3.5 - 5.8
Lowest oil pressure alarm (shutdown) (Bar) 1
Max. oil temperature (°C) 105
Oil flow (L/min) 118
Oil fuel consumption ratio based on engine fuel consumption data ..... ≤ 0.2 %
Total system capacity (including filters) (L) 30

Noise

Diesel engine noise (Acoustic power level) (dB(A)) 113.1

Fuel system

Governor ..... Electronic
Max. restriction at fuel pump inlet (Bar) 0.5
Max. fuel return restriction (Bar) 0.5
Max. fuel inlet temperature (°C) 70
Fuel supply flow (L/hr) 169
Min. pressure of fuel pump (Bar) 1.3
Min. diameter of inlet pipe (mm) 12
Min. diameter of return pipe (mm) 12

Electrical system

Electrical system voltage (negative to ground) (Vdc) ..... 24 / 12
Starter power (kW) ..... 5.4 for 24 Vdc / 3 for 12 Vdc
Battery charger current (A) ..... 55 for 24 Vdc / 80 for 12 Vdc
Recommended battery (Ah) 100
Min. sectional area of wire (mm²) 50
Min. cold start temperature without auxiliary starting device (°C) ..... - 10
Min. cold start temperature with auxiliary starting device (°C) ..... - 30

Heat balance test data (with ambient temperature 28 °C)

Total heat dissipation @ ESP (kJ/s) 259.7

Performance data

Mean Piston Speed (m/s) 6.5

BMEP (Bar) 16.45

Fan absorbed power (kW) 11

Fuel consumption

Rating	gr/kWh	L/hr
100% ESP	193	46.3
100% PRP	193.8	42.1
75% PRP	193.9	31.6
50% PRP	201.6	21.9
25% PRP	226.1	12.3
	Fuel consumption tolerance + 3 %	

Ratings definitions

Emergency Standby Power (ESP)
Emergency Standby Power is the maximum power available for a varying load for the duration of a main power network failure. The average load factor over 24 hours of operation should not exceed 70% of the engine's ESP power rating. Typical operational hours of the engine is 200 hours per year, with a maximum usage of 500 hours per year. This includes an annual maximum of 25 hours per year at the ESP power rating. No overload capability is allowed. The engine is not to be used for sustained utility paralleling applications.

Prime Power (PRP)
Prime Power is the maximum power available for unlimited hours of usage in a variable load application. The average load factor should not exceed 70% of the engine's PRP power rating during any 24 hour period. An overload capability of 10% is available, however, this is limited to 1 hour within every 12 hour period.

Continuous Power (COP)
Continuous Power is the maximum power available for an unlimited period of use at a constant load factor. No overload capability is allowed.

1) All ratings are based on operating conditions under ISO 8528-1, ISO 3046, DIN6271. Performance tolerance of ±5%.
2) Test conditions : 100 kPa, 25°C air inlet temperature, relative humidity of 30%, with fuel density 0.84 kg/L. Derating may be required for conditions outside these; please contact the factory for details.
3) Power output curves are based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan and optional equipment.

WEICHAI

THREE-PHASE SYNCHRONOUS GENERATOR 20200101

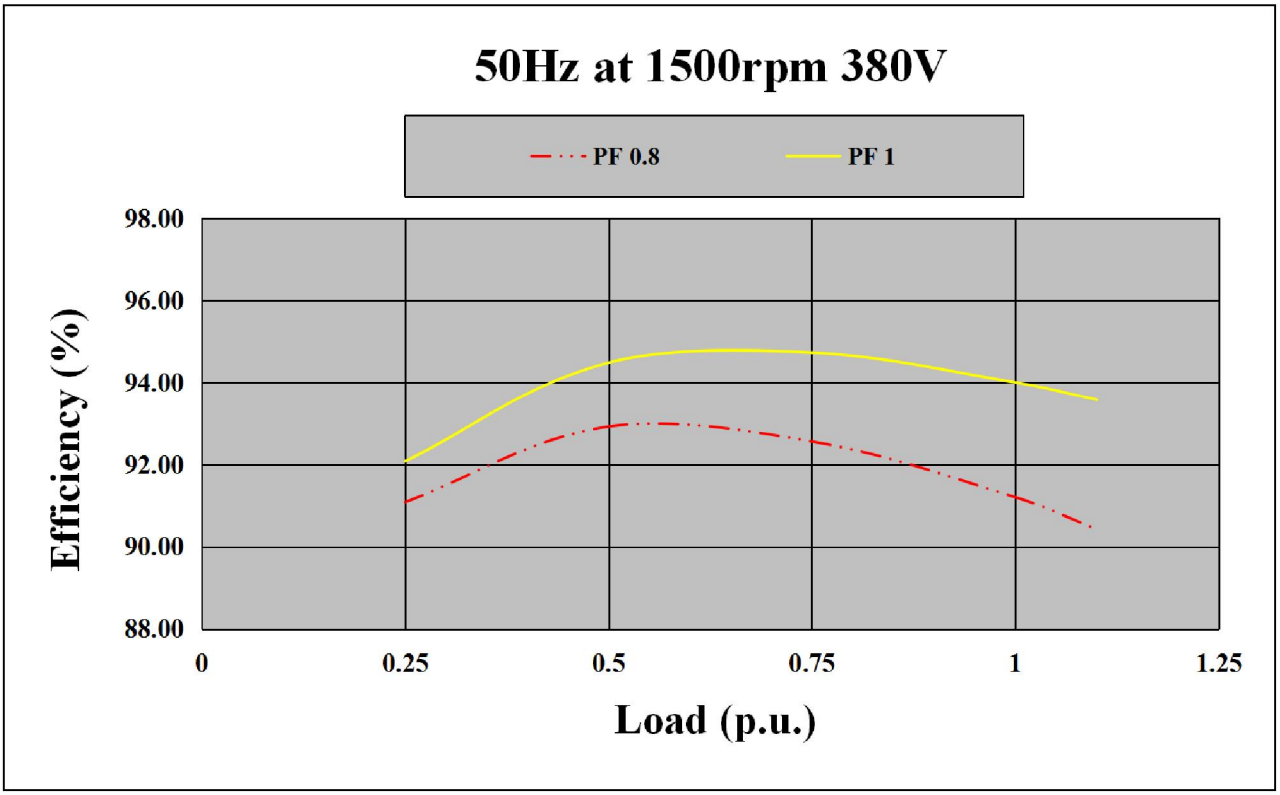
Datasheet For 50Hz @ 1500rpm / 60Hz @ 1800rpm

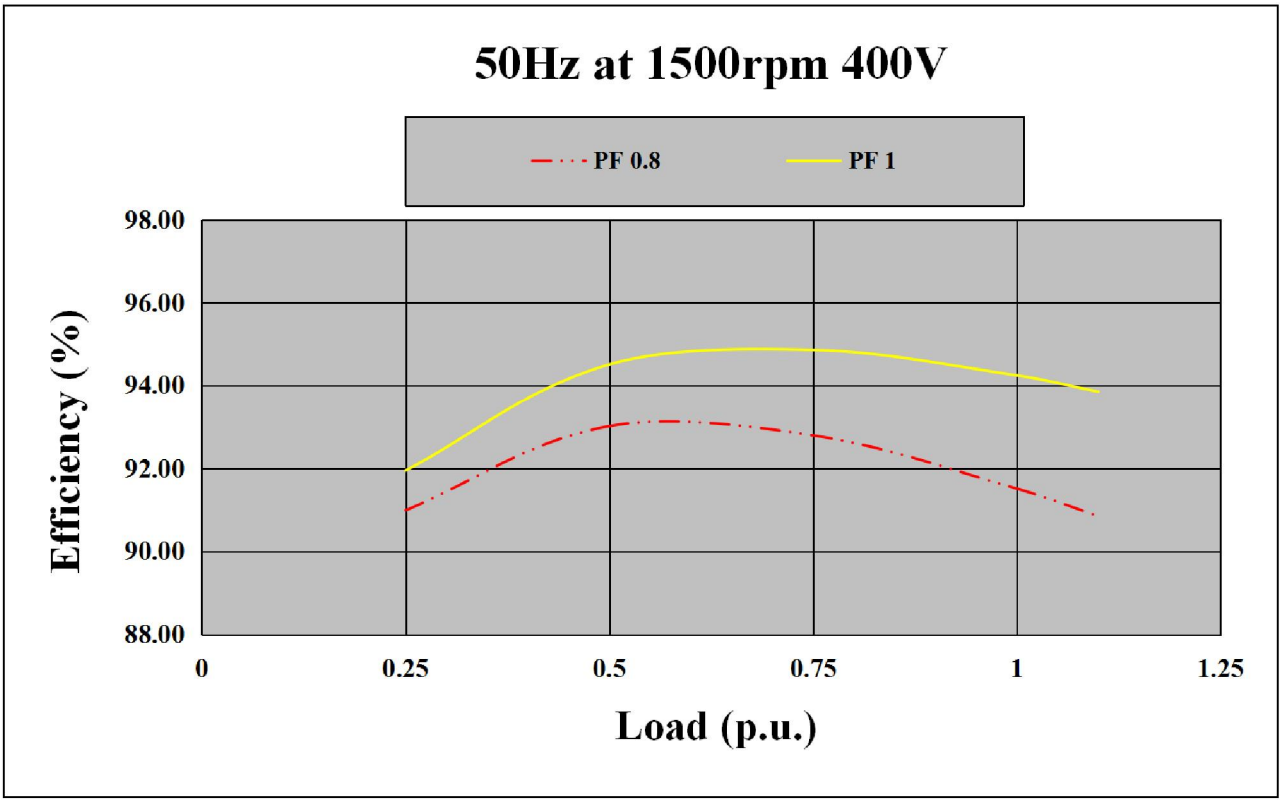
WHA-200-4/0.4

Frequency	Hz	50			60				
Rated capacity (kVA)	S	200	200	200	202	220	236	244	252
Rated power (kW)	P	160	160	160	162	176	189	195	202
Voltage (V)	U	380	400	415	380	416	440	460	480
Short-circuit ratio	Kcc	0. 332	0. 405	0. 479	0. 239	0. 277	0. 305	0. 339	0. 385
Reactance									
Direct axis synchronous reactance	Xd	3.873	3. 495	3. 247	4. 706	4. 217	4. 03	3. 846	3. 677
Direct axis transient reactance saturated	X'd	0.119	0. 108	0. 1	0. 145	0. 13	0. 124	0. 119	0. 113
Direct axis subtransient reactance saturated	X"d	0.117	0. 106	0. 098	0. 142	0. 127	0. 122	0. 116	0. 111
Quadrature axis synchronous reactance	Xq	1.751	1. 58	1. 468	2. 127	1. 906	1. 822	1. 738	1. 662
Quadrature axis subtransient reactance	X"q	0.191	0. 172	0. 16	0. 232	0. 208	0. 199	0. 19	0. 181
Negative sequence reactance saturated	X2	0.15	0. 14	0. 13	0. 19	0. 17	0. 16	0. 15	0. 15
Zero sequence reactance unsaturated	X0	0.045	0. 04	0. 037	0. 054	0. 049	0. 046	0. 044	0. 042
Time constant									
Open circuit time constant	T'd0	1. 32	1. 32	1. 32	1. 32	1. 32	1. 32	1. 32	1. 32
Short-circuit transient time constant	T'd	0. 041	0. 041	0. 041	0. 041	0. 041	0. 041	0. 041	0. 041
Subtransient time constant	T"d	0. 001	0. 001	0. 001	0. 001	0. 001	0. 001	0. 001	0. 001
Armature time constant	Ta	0. 011	0. 011	0. 011	0. 011	0. 011	0. 011	0. 011	0. 011
No load losses	W	1988	2078	2148	2739	2885	2989	3081	3176
Heat dissipation at full load at Class H	W	15438	14854	14668	15779	15994	16700	16924	17303
Efficiency									
PF=0.8 Efficiency of 25% load	%	91.08	90.98	90.58	90.23	90.34	90.54	90.37	90.42
50% load	%	92.92	93.01	92.82	92.56	92.84	92.96	92.94	92.97
75% load	%	92.55	92.79	92.72	92.35	92.82	92.92	93.02	93.10
100% load	%	91.20	91.51	91.60	91.10	91.67	91.87	92.02	92.10
110% load	%	90.42	90.84	90.98	90.44	91.05	91.25	91.43	91.54
PF=1 Efficiency of 25% load	%	92.07	91.94	91.79	91.00	91.20	91.42	91.29	91.27
50% load	%	94.48	94.50	94.45	93.92	94.15	94.33	94.28	94.33
75% load	%	94.73	94.86	94.88	94.27	94.58	94.73	94.83	94.91
100% load	%	94.00	94.24	94.36	93.66	94.06	94.24	94.38	94.48
110% load	%	93.57	93.85	93.97	93.24	93.69	93.89	94.05	94.17
No load excitation current	io(A)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Full load excitation current	ic(A)	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Full load excitation voltage	uc(V)	52	52	52	52	52	52	52	52
Recovery time	Tr	1 s							
Waveform : TIF		<50							
Waveform : THD		No load <3% Non-Distorting Balanced Linear Load <5%							
Waveform : THF		<2%							
Winding pitch		2/3							
Steady state voltage regulation		+/- 1%							
A.V.R. model		EVC600/EVC800							
Duty		Continuous							
Number of poles		4							
Class of insulation		H							
Altitude		≤1000m							
Rated power factor		0.8							
Excitation		Brushless							
Stator winding		6ends							
Rotor		With damping cage							
Overload	%	110% rated load for 1 hour							
Stator winding resistance (20℃)	ohm	0.02023							
Rotor winding resistance (20℃)	ohm	0.5444							
Exciter Stator resistance (20℃)	ohm	9.6							
Exciter Rotor resistance (20℃)	ohm	0.0508							
Cooling air requirement	m3/min	38.7			46.4				
Method of cooling		IC 01							
Ambient temperature		40℃							
Sense of rotation		Clockwise-DE							
Type of construction		1 Bearing or 2 Bearings							
Degree of protection / enclosure		IP21 or IP23							
Maximum overspeed		2250 rpm 2minutes							

THREE-PHASE SYNCHRONOUS GENERATOR

THREE PHASE EFFICIENCY CURVES





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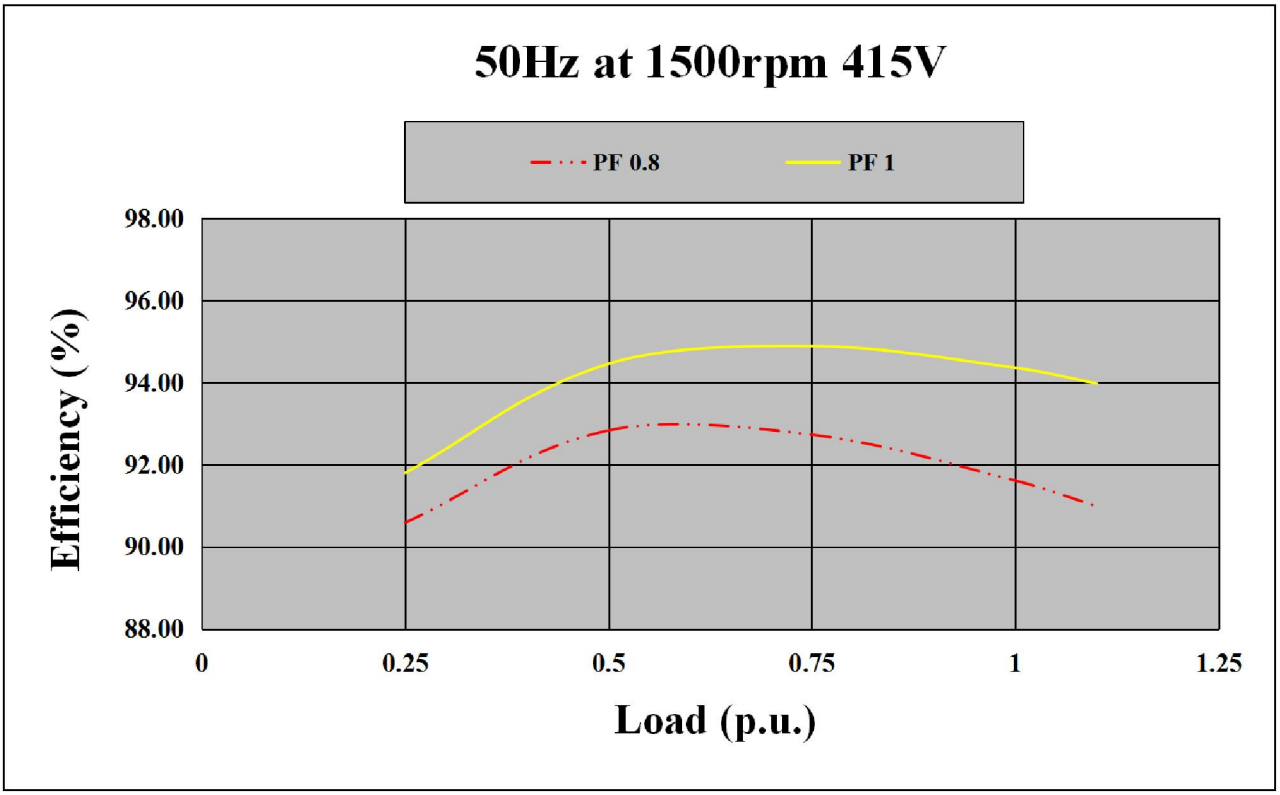

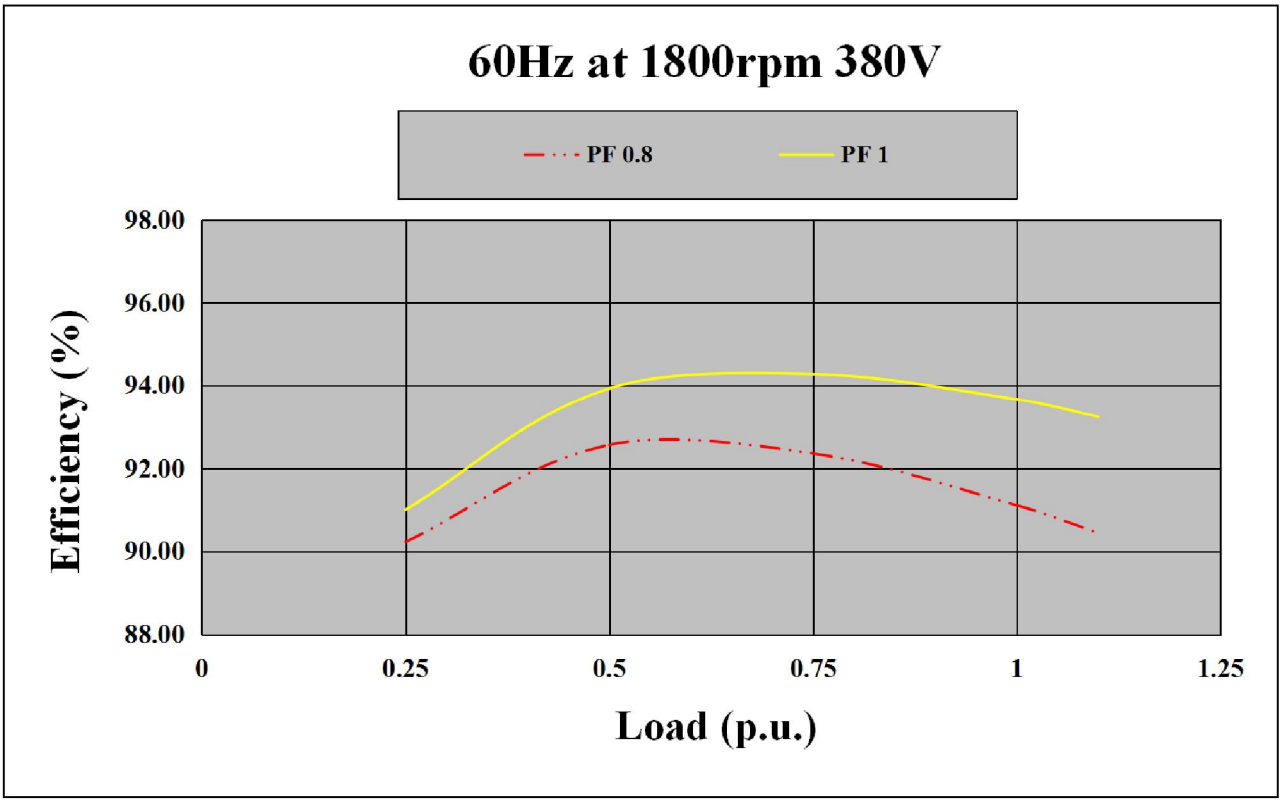

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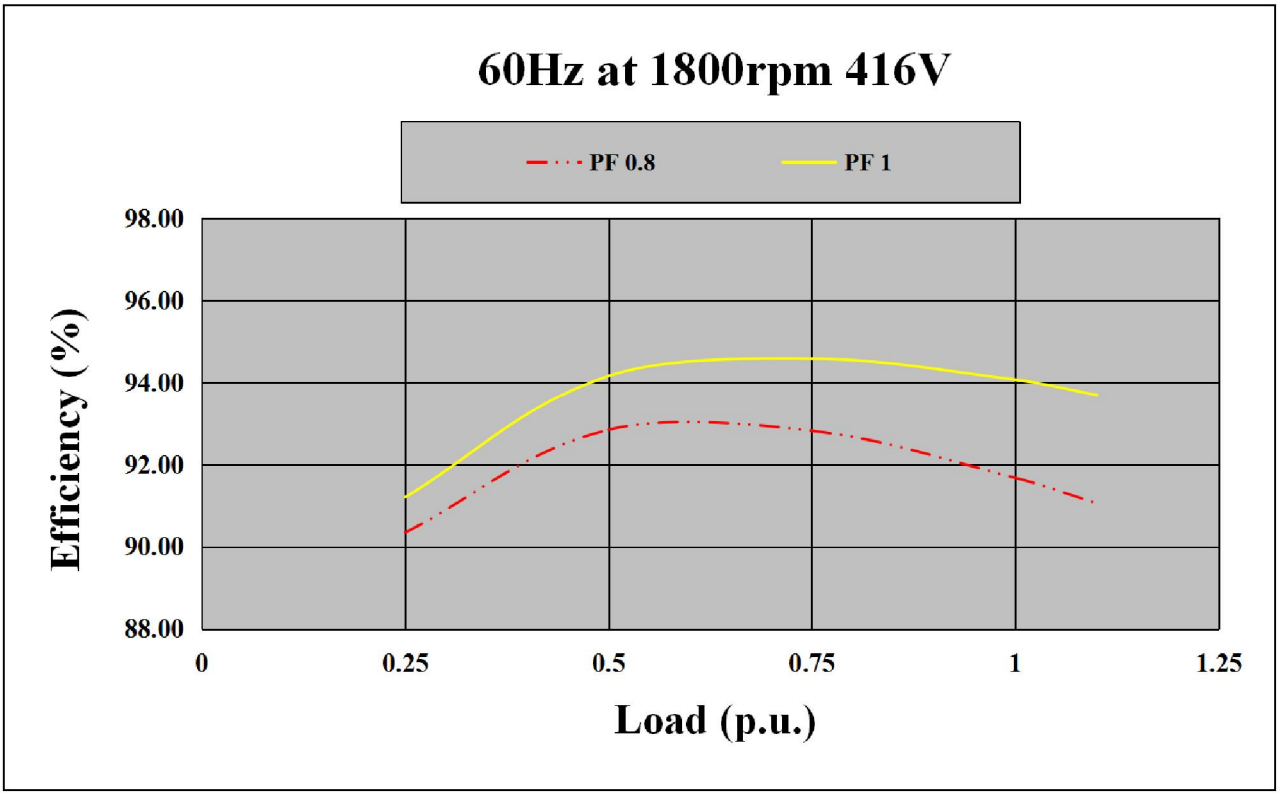

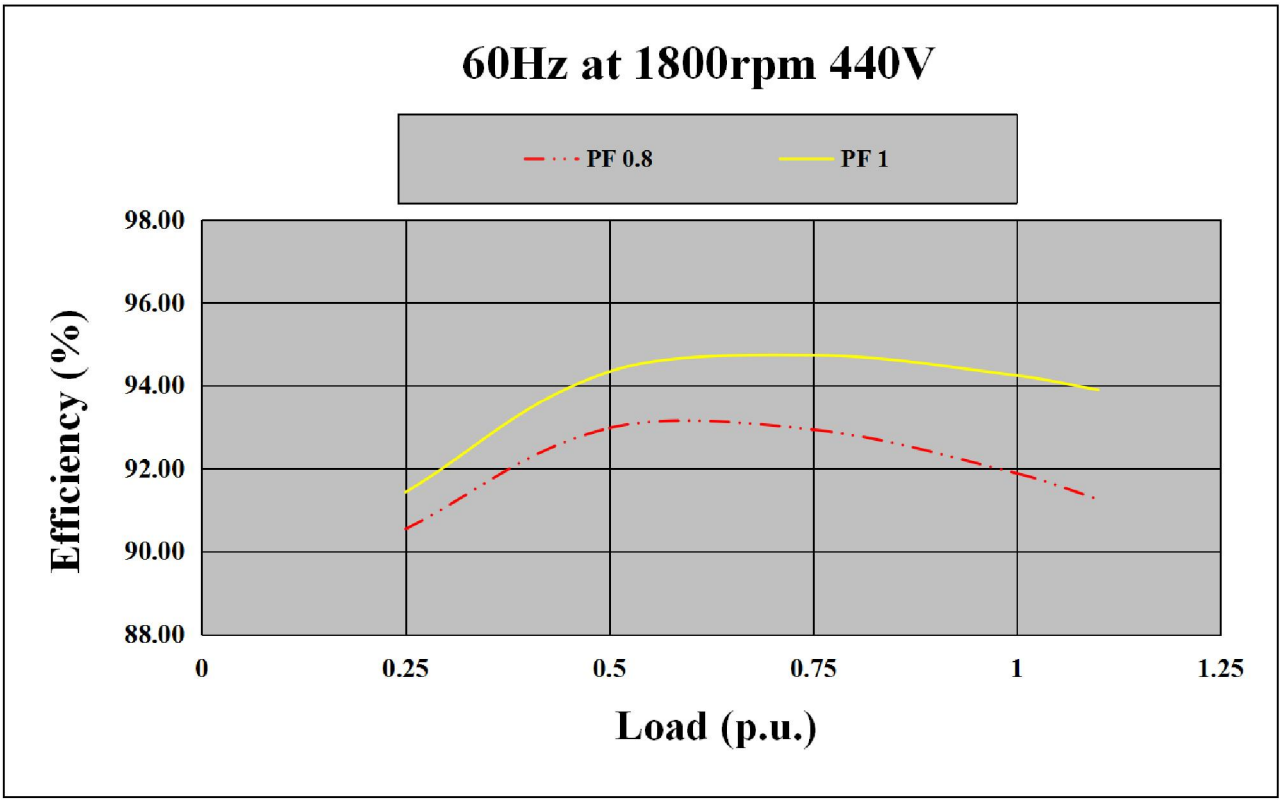

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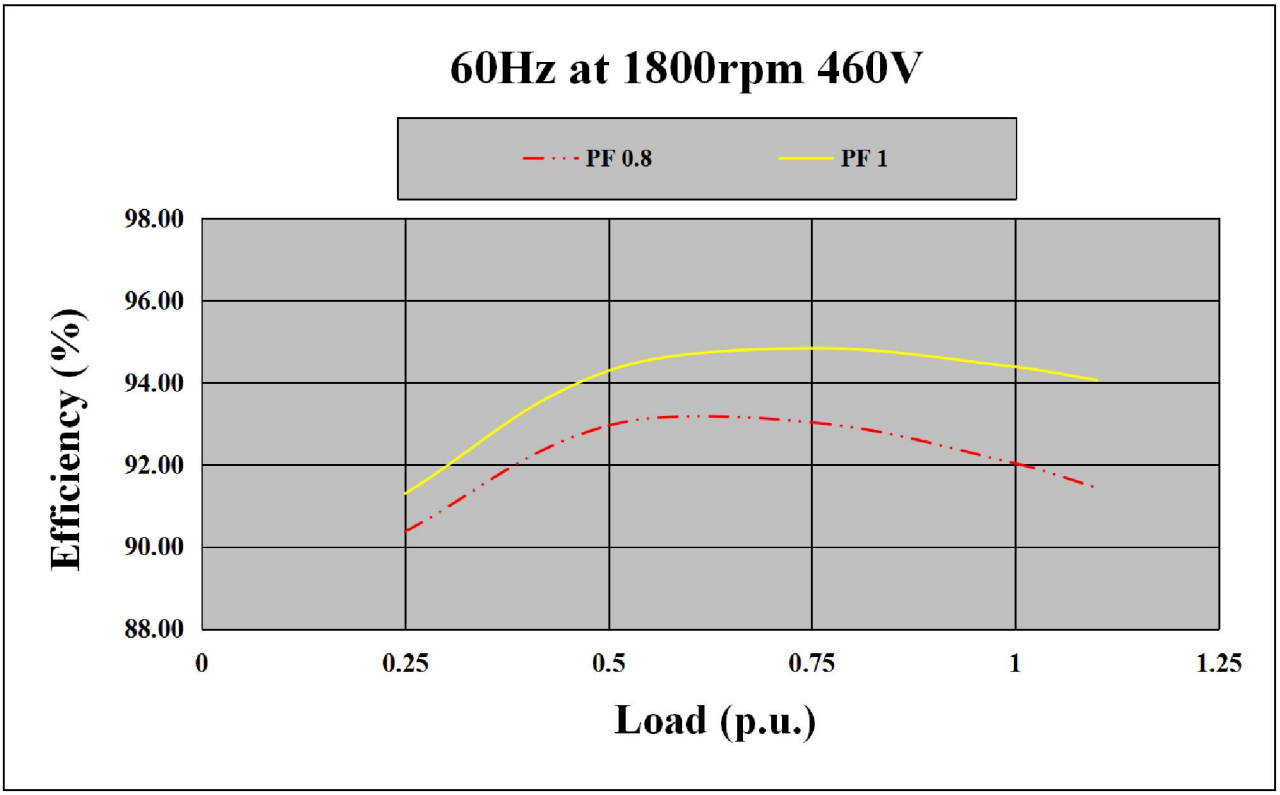

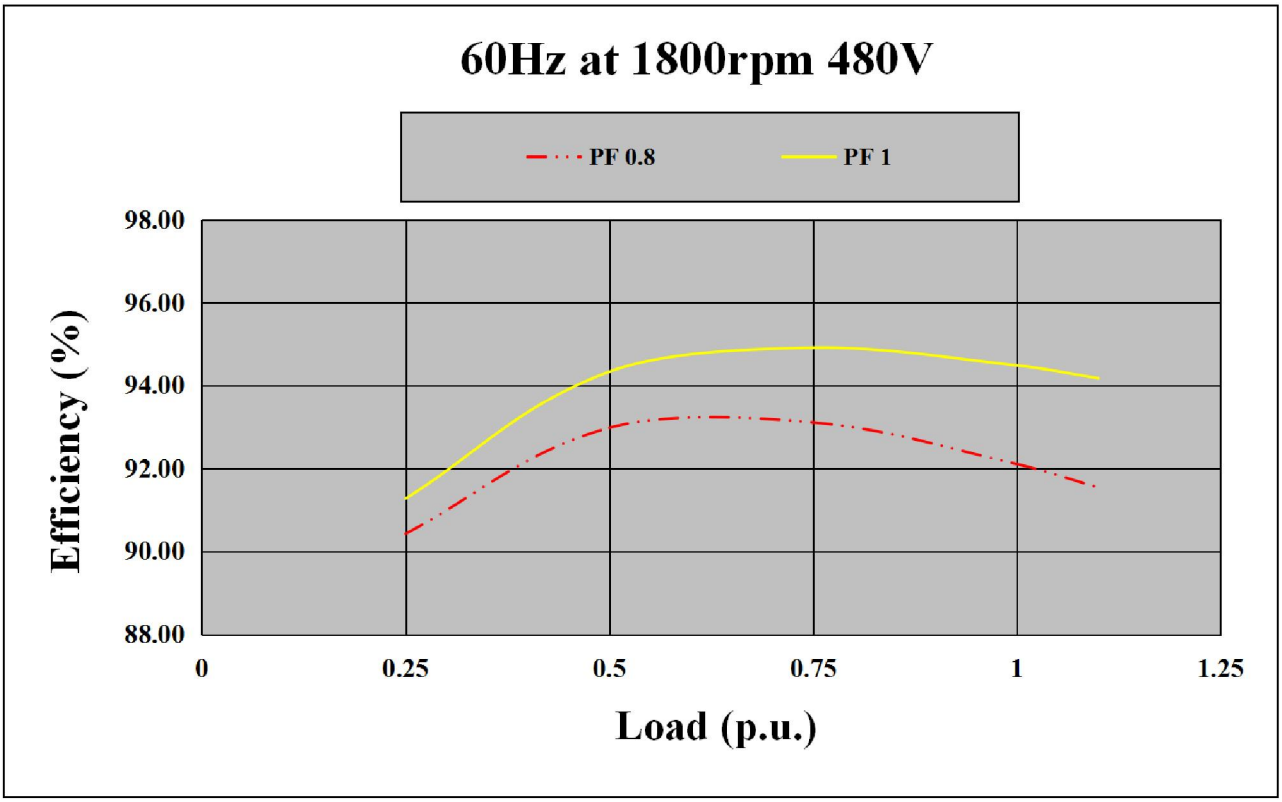

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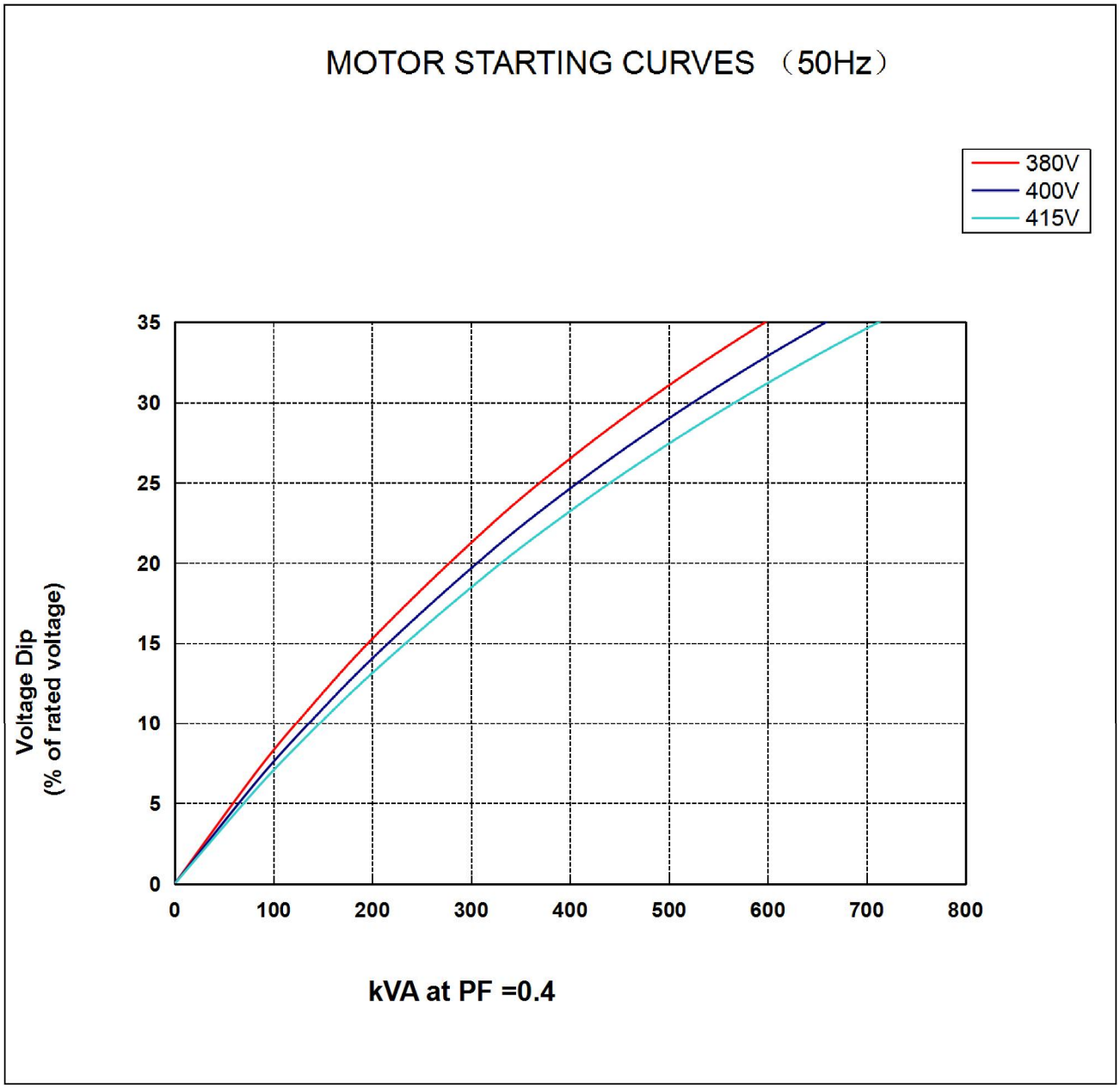
THREE PHASE SYNCHRONROUS GENERATOR

WHA-200-4/0.4



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THREE PHASE SYNCHRONROUS GENERATOR

WHA-200-4/0.4